DETERMINANTS OF THE SEX RATIO AT BIRTH:

EVIDENCE FROM THE CHINA 2000 AND 2010

COUNTY POPULATION CENSUS

by

Julie Ford

A thesis submitted to the faculty of
The University of Utah
in partial fulfillment of the requirements for the degree of

Master of Arts

in

Asian Studies

College of Humanities

The University of Utah

May 2014

The University of Utah Graduate School

STATEMENT OF THESIS APPROVAL

The thesis of **Julie Ford**

has been approved by the following supervisory committee members:

Ming Wen	, Chair	**3/1/14**
		Date Approved
Kim Korinek	, Member	**3/3/14**
		Date Approved
Valerie Hudson	, Member	**2/11/14**
		Date Approved

and by **Janet Theiss** , Chair/Dean of

the Department/College/School of **Asian Studies**

and by David B. Kieda, Dean of The Graduate School.

ABSTRACT

By analyzing evidence from the China 2000 and 2010 County-level Censuses, which includes over 3,000 county units, questions regarding which socio-demographic covariates correlate with the sex ratio at birth can be answered. This study investigated variables that have connections to gender discrimination – such as gender difference in illiteracy – and conducted OLS and logistic analysis at the 2000, 2010, and 2000-2010 years. Results indicate the gender difference in college enrollment revealed the most conclusive findings, with a positive relationship to the SRB at the 0.001 significance level. In two of the models, there was a positive correlation of the prevalence of multigenerational households and the SRB. All the results suggest that urbanization is a negative covariate of SRB, although results are not significant in the 2010 analysis. According to these results, efforts ought to be made at targeting women's education in counties with a large gender gap in college enrollment, policies ought to be catered to rural areas as well as urban areas, and formation of nuclear families ought to be encouraged as opposed to families based on virilocal marriage.

TABLE OF CONTENTS

LIST OF TABLES

ACKNOWLEDGEMENTS

Sincere gratitude is extended to the following who never ceased in helping until this thesis was complete:

My fantastic committee chair, Dr. Ming Wen, for her unwavering help and support throughout all the many bumps of the project;

Dr. Andrea den Boer, for her advice, aid, and her expertise about the sex ratio in China;

Especially my great mentor, Dr. Valerie Hudson, who never stopped believing in me and has been a constant support, giving invaluable insights and guidance;

For the moral support and encouragement of my dear husband, Kurt Brenning, who never let me give up and gave me wings to fly;

To Daniel, who was there all along;

Above all, utmost appreciation to my Heavenly Father for His divine guidance and intervention in this project.

INTRODUCTION

Throughout much of Asia, the skewed sex ratio at birth (SRB) has alarmed demographers, economists, policy makers, security specialists, and the general public ("International Workshop" 7). The most recent figures estimate that in 2010 there were approximately 33.98 million missing females in China's population (den Boer and Hudson 23). The causes and correlations of the world's most skewed SRB have been a question of debate for decades. From the belief that it was a natural occurrence caused by hepatitis in the 1980s to the realization that girls were being culled from the population by choice via sex-selective abortion, the journey to uncovering the causes and curing the ills has been a long one.

A "second" demographic transition has been taking place amongst developed nations and some developing nations characterized by a decline in mortality, low birth rates, and older age of marriage (Van De Kaa 1). As China has made the transition into modernity, in large part due to the "open up and reform" of Deng Xiaoping in the late 1970s, the Chinese government has sought to "hasten" the pace of the natural demographic shift by implementing and enforcing the One Child Policy. In 2007, Zhang Weiqing, minister in charge of the National Population and Family Commission in China, declared the family planning policy in China to be a great success. Nearly 30 years after the introduction of the One Child Policy, he enthusiastically stated, "Compared with the world's other developing countries with large populations, we have realised this

transformation half a century ahead of time" ("Has China's One-Child Policy Worked").

By preventing at least 400 million births, the One Child Policy in China has hit the year 2000 target population of 1.2 billion (rough estimates reach 1.27 billion) (Hesketh, Li, and Zhu 1172). Although population growth has been curbed, partly due to the One Child Policy and partly due to social trends, there is a darker side to the effects of this policy. When given the choice to have only one child, and with the advent of ultrasounds, families are choosing to have sex-selective abortions. The toxic mix of gender discrimination and the One Child Policy has had drastic results: by 2020, there will be an estimated 20.6 million excess males (aged 15-34) in China's population (den Boer and Hudson 24).

This paper investigates socio-demographic variables that may indicate gender discrimination in China at the level of the county. By looking at evidence from the 2000 and 2010 County-level Censuses, questions regarding which socio-demographic covariates correlate with the sex ratio at birth can be answered. County level data include over 3,000 county units as opposed to only 28 at a Provincial-level analysis. This is vital research as the Chinese government has in the last decade implemented the Care for Girls Campaign to decrease the abortion of daughters but has not yet met significant progress in achieving a natural sex ratio (Li, "One Minute" 27). Although some variables—such as the One Child Policy and Chinese ethnicity—have been explored in conjunction with the sex ratio at birth, the social and demographic underpinnings of the imbalanced sex ratio have not been well understood (Tang, Teng, and Liou 129). Exploring socio-demographic variables that are linked to conditions of gender and traditional son preference could establish new insights for further research and policy development addressing the

imbalanced SRB. This paper will explore the following questions:

Q1: What are the patterns of the SRB at the county level?

Q2: Are county-level variables such as multigenerational households (%), urbanization, in-migration, gender difference in college enrollment, and gender difference in illiteracy significantly associated with the SRB?

BACKGROUND

The Culture of Son Preference

In a worldwide analysis of the causes of the skewed sex ratio at birth, Tim Dyson asserts that the root of the imbalance is a culture that sustains patriarchal values (445). Hartmann argues that in a public-private capitalist society, men maintain their control over the labor power of women through hierarchical organization and control. She explains that in the transition to a capitalist system " . . . a direct personal system of control was translated into an indirect, impersonal system of control, mediated by society-wide institutions" (138). Dyson claims that some of these institutions—including the practice of patrilocality, policies that promote abortion as part of its family planning, and countries with a decline in fertility—are the basis of the sex-ratio imbalance (446). China boasts all three characteristics and an economy that transitioned into capitalism while still maintaining a culture framed by patriarchal norms.

In this patriarchal society, the decision to abort a baby daughter is indeed influenced by institutions upheld by patriarchy. Mason asserts that "[t]o the extent that women in these societies are powerless, their voice in fertility decision[s] is unlikely to be strong" (732). By looking at socio-demographic indicators, such as rural areas that propagate traditions (Confucianism, for example) averse to women's progress, we will be able to clearly see the association to the sex ratio at birth. Dyson continues, "Although

these [birth-sex] ratios reflect the patriarchal nature of the societies involved, they also help to sustain patriarchy" (453). My analyses test theories which maintain that women's status, indicated by variables such as the gender gap in education, has an impact on the aggressiveness of son preference, and therefore the decision to abort a daughter.

Overview of the Sex Ratio at Birth

The SRB is a measure of the ratio of boy infants compared to girl infants, represented by the number of boys per 100 girl infants. A normal ratio is usually between 103 to 107; a higher ratio indicates a general devaluation of daughters. As of the 2010 Census, the male to female birth sex ratio in China was 121.2, increasing since the 2000 ratio of 119.9 (Jiang, Li, and Feldman "China's Missing Girls" 61). Of note are the following trends given in a report from the World Bank ("Gender Gaps in China"):

a) Every province in China, except two, have had a percent increase change of the SRB over three decades (see Table 1).
b) The provinces with the largest increases in the SRB from 1990 to 2010 are located in the central parts of China, from Guizhou in the southwest to Anhui in the northwest to Fujian in the southeast (see Fig. 1).
c) The SRB has been steadily increasing in a widespread trend since the 1990s (see Fig. 2).
d) Rural and urban areas have all consistently exhibited trends of increasing SRB (see Fig. 3)
e) The SRB is consistently high in both high-income and low-income provinces but is most severe in poverty-stricken areas.

Table 1

Sex Ratio at Birth by Province—1990, 2000, 2010

Province	1990	2000	2010	Percent Increase Change (1990 to 2010)
Beijing	107.49	110.56	109.48	2%
Tianjin	110.14	112.51	113.69	3%
Hebei	112.49	113.43	114.88	2%
Shanxi	109.64	112.52	110.22	1%
Inner Mongolia	108.35	108.45	112.1	3%
Liaoning	110.16	112.83	110.18	0%
Jilin	108.67	111.23	111.18	2%
Heilongjiang	107.30	109.71	112.41	5%
Shanghai	104.83	110.64	111.15	6%
Jiangsu	114.93	116.51	116.24	1%
Zhejiang	117.64	113.86	118.13	0%
Anhui	110.87	127.85	128.64	14%
Fujian	110.29	117.93	125.59	12%
Jiangxi	110.82	114.74	122.84	10%
Shandong	115.12	112.17	119.41	4%
Henan	116.21	118.46	117.77	1%
Hubei	109.56	128.18	124.09	12%
Hunan	110.25	126.16	123.23	11%
Guangdong	111.99	130.3	120.34	7%
Guangxi	116.91	125.55	122.68	5%
Hainan	114.86	135.64	125.29	8%
Chongqing	NA	115.13	112.51	NA
Sichuan	111.96	116.01	111.64	0%
Guizhou	101.24	107.03	122.12	17%
Yunnan	107.42	108.71	111.77	4%
Tibet	103.22	102.72	106.61	3%
Shaanxi	111.35	122.1	115.33	3%
Gansu	110.82	115.82	117.37	6%
Qinghai	104.36	110.35	112.4	7%
Ningxia	106.96	108.79	113.86	6%
Xinjiang	104.63	106.12	106.14	1%

Source: 1990, 2000, and 2010 China Population Censuses

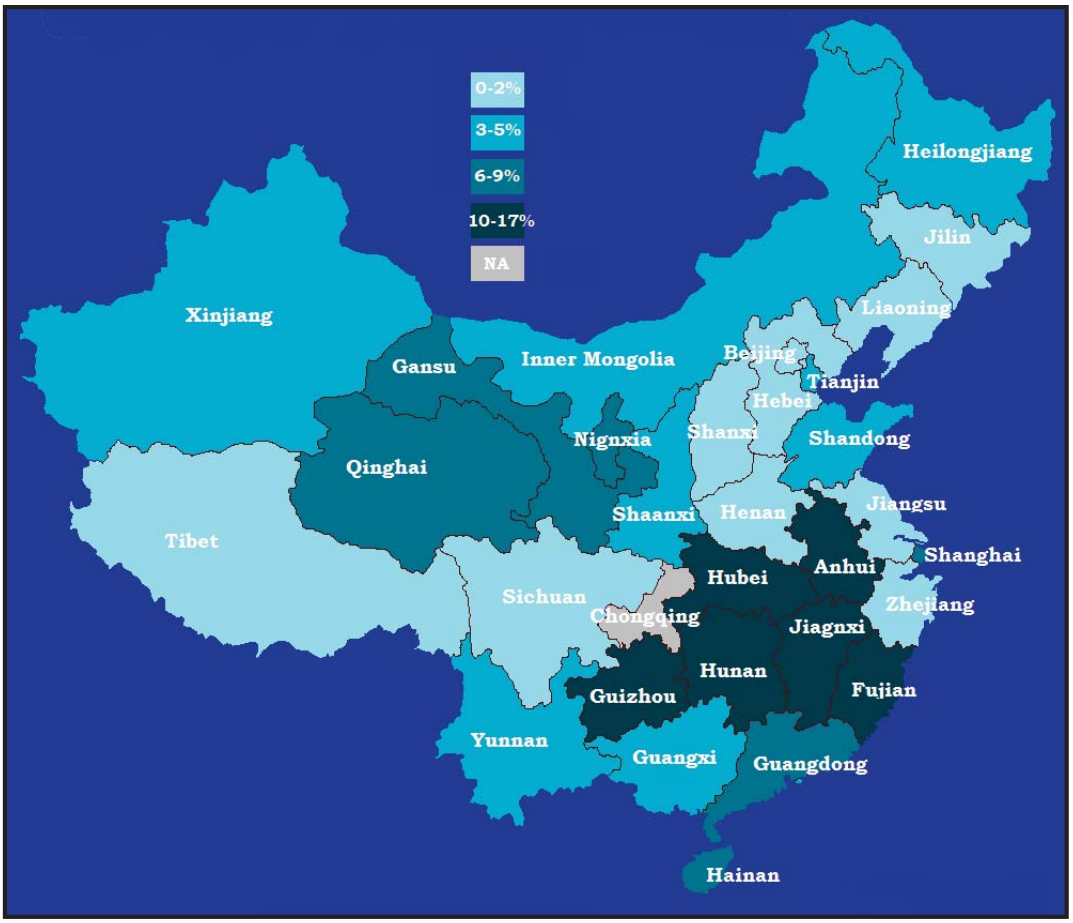

Fig. 1

SRB Percent Increase Change by Province—1990 to 2010

According to Table 1, every province has seen its SRB increase from 1990 to 2010 (except Sichuan, which remained the same). The average percentage increase from 1990 to 2010 is 5%.The provinces that have decreased in SRB and shown improvement from 2000 to 2010 are Beijing, Shanxi, Liaoning, Hubei, Hunan, Guandong, Guangxi, Hainan, Chongqing, Sichuan, and Shaanxi. Slight decreases were observed in the Jilin, Jiangsu, and Henan provinces. The peak SRB was 135.64 in Hainan in 2000; the lowest SRB was 102.72 in Tibet in 2000.

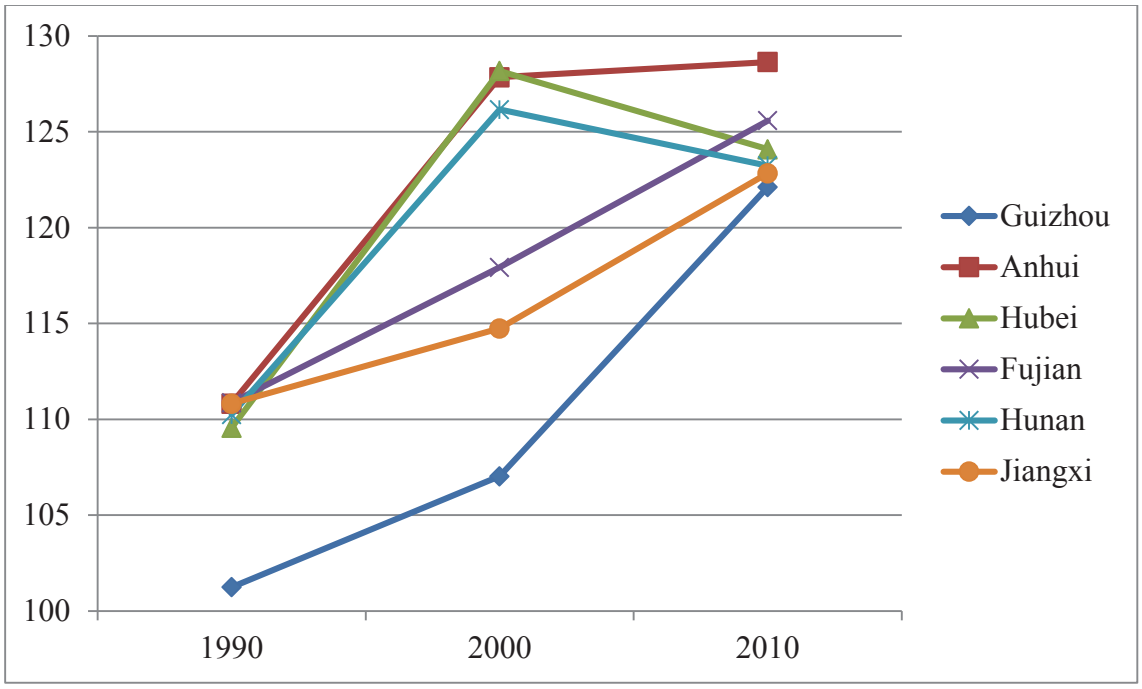

Fig. 2

Sex Ratio at Birth of Six Provinces —1990, 2000, 2010

According to Fig. 2, there are clear regional disparities in the percentage change of the SRB from 1990 to 2010. There are two main "pockets" of significance with the greatest percentage change being in the central south-east of China (e.g., Hubei, Hunan, and Fujian Provinces). The other pocket is in central west China (e.g., Qinghai and Gansu Provinces).

As shown in Fig. 3, the largest increases from 1990 to 2010 are from the provinces of Guizhou (17% increase), Anhui (14% increase), Hubei (12% increase), Fujian (12% increase), Hunan (11% increase), and Jiangxi (10% increase). Besides Jiangxi and Hubei, the provinces have had an alarming increase in the SRB from 1990 to 2010. These provinces with the largest percentage increase in the SRB are located in the

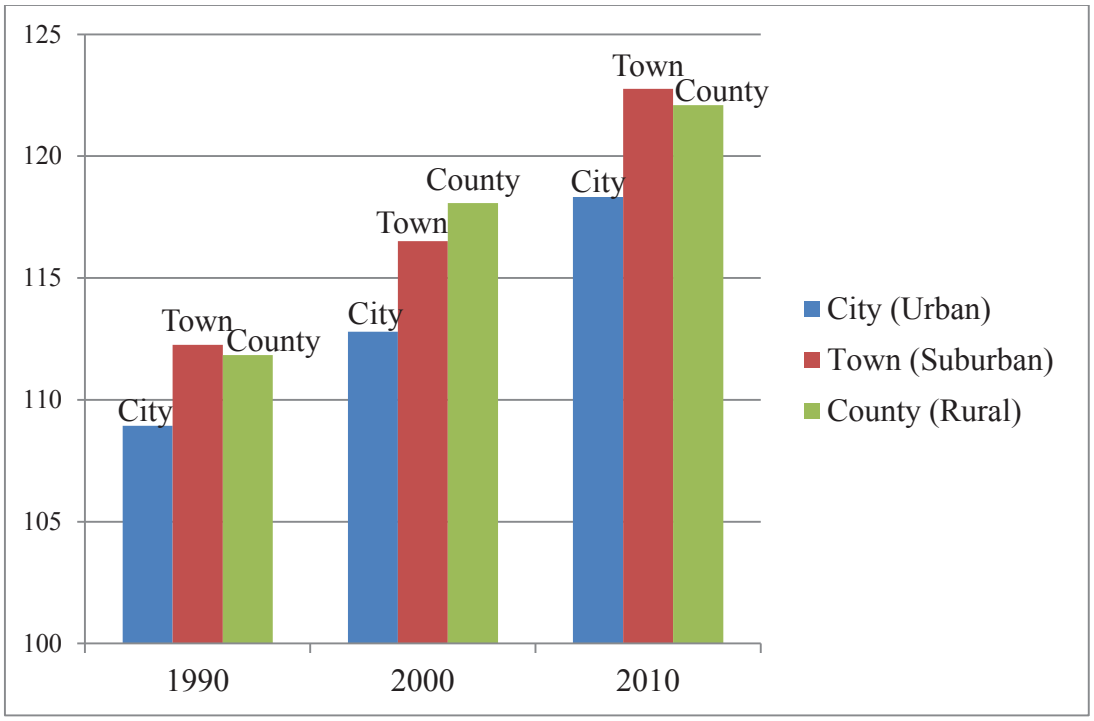

Fig. 3

Sex Ratio by City, Town, and County—1990, 2000 and 2010

Source: 1990, 2000, and 2010 China Population Censuses

more central parts of China (see Fig. 2). Guizhou has the largest increase (17%) of all provinces, with an SRB of 101.24 in 1990 and then 122.12 in 2010. This province may present a good case study to investigate the reasons underlying such a large increase over the three decades.

According to Fig. 4, at every level of society—city, town, and county—the SRB has increased over time. The urban SRB in 2010 is almost equivalent to the rural SRB in 2000, showing a significantly increased SRB in urban areas. Suburban, not rural, areas have the highest SRB in 2010, reflecting the same pattern in 1990.

Consequences of Missing Daughters

The impact of missing daughters reaches from the smallest village in China to the world. For every girl that is not born in China, an "excess" baby boy is born— a bare branch on the family tree who will not be able to find a wife to marry. Chinese officials admit that there will be at least 30 million excess men in China by 2020 (S. Wang). Most of these men come from rural areas, are poor, and lack any competitive attributes for a prospective marriage. According to one study, these men are marginalized, lonely, withdrawn, and prone to psychological problems (Hesketh 759). The most likely immediate consequence is an increase in prostitution and sex trafficking. A study using annual province-level data from 1988–2004 shows that a 1% increase in the sex ratio raised violent and property crime rates by 3.7% (Edlund et al. 1). This study concludes that "the sex-ratio imbalance accounts for up to one-sixth of the overall rise in crime in China" (Edlund et al. 1).

The Chinese people are truly concerned about the instability that bare branches bring to their communities. Indeed, it is estimated that at least 40% of Chinese live in neighborhoods with an extremely high SRB (Y. Cai 17). A study in China that surveyed 7,435 men and women of reproductive age in three provinces (Zhejiang, Guizhou, and Yunnan) found that there were major worries about the impact that excess men would have in their areas: 65% thought crime would increase; 60% saw it as a threat to societal stability; and 56% thought it would lead to an increase in prostitution and trafficking (Hesketh 760).

Gangs, crime, and the effects of "bare branches" at the village and provincial levels are just the beginning; there are a slew of consequences knocking at China's door.

The most obvious is a threat to socioeconomic development. A China report argued "that sex selection both reflects and reinforces women's low social status, which—beyond its intrinsic cruelty—impedes the development of democracy and prosperity in male-skewed nations" (S. Wang). The skewed SRB reinforces patriarchy, which supports the subjugation of women in society, thereby impeding women's contributions to the economy and to society as a whole. An impending "marriage squeeze" —a state in which there is more men than women—has led some to engage in in-state and cross-border bride trafficking (Jiang, Li, and Feldman "Marriage Squeeze" 361).

According to the 2008 U.S. Country Report on Human Rights Practices, within China, approximately 500 females commit suicide per day, giving China the distinction of the only country in the world where more women commit suicide than men ("2009 Human Rights Report"). The U.S. State Departments reports that these high suicide rates are largely due to the manifestation of patriarchy in the forms of traditional preference for male children, the country's birth limitation policies, violence against women and girls, subservience of wife to husband, and the desperation rural women face in the traditional kinship system ("2009 Human Rights Report"). Other studies show that the skewed SRB lowers the quality of life, increases the rate of STDs and drug use nationally, drastically changes the marriage market, and increases national instability (Dyson 453). All of these consequences clearly threaten the Communist Party's goals of a peaceful and harmonious society.

These deep repercussions do not stop at the national and domestic levels. The severely imbalanced SRB and its accompanying effects will also take a toll at the international level. One anecdotal story paints the picture well. A young 26-year-old

Myanmar woman named Thazin drank a cup of coffee in June 2011 and woke up to find herself being forcefully married to a man in China. The coffee had been spiked by an acquaintance; she was smuggled across the border and bought by the man in China. Although bride trafficking is not a new phenomenon, 70% of Myanmar's trafficking cases in 2010 were akin to Thazin's story ("Myanmar"). The UN reports that as "bare branches" increase in society, forced marriages, bride trafficking, and other vicious forms of human trafficking are likely to rise in China and its surrounding borders ("Report of the International Workshop on Skewed Sex Ratios at Birth" 12). Hudson and Den Boer pointed out the dangers that large cohorts of single men may have globally, stating, "Specifically, internal instability is heightened in nations displaying exaggerated gender inequality, leading to an altered security calculus for the state" (6). Others speculate that the chances of a libertine democratic state are reduced (Dyson 454).

Government Intervention

The Chinese government has been supporting and also combating the skewed SRB. The One Child Policy, held under the umbrella of the Family Planning Commission, allows most families only one child, and when given a choice, an only boy is usually preferred. Widespread access to ultrasound technology has made it easier for families to choose sex-selective abortions over female infanticide in both urban and rural areas (Li 5). When the family-planning policy was instituted, it was clear that Chinese officials were aware of the future implications of a masculinized population. Officials knew of "[a]bundant research [that] had shown that the organization of rural socioeconomic life and entrenched gender values made at least two children and one son vital to peasant security and even survival" (Greenhalgh 268). And yet the policy is still being pushed

forward with strong political will and sometimes even coercion.

In 2000, the Chinese government began seriously combating the skewed SRB by pursuing a national Care for Girls Campaign (CGC), which is also under the umbrella of the Family Planning Commission. The CGC hopes to take a deep, comprehensive approach to decreasing the SRB with goals extending as far as 2020 and beyond ("Zhongguo" 33). The plan began in 2000 with an experimental program in one county, then expanded to 24 counties in a CGC pilot program, and by 2009, every province at the national level had implemented the CGC. Because of the extensive, long-term nature of the CGC, the base causes for the skewed SRB will need to be addressed by the Chinese government if the campaign has hopes of reaching its goal of "ultimately achiev[ing] a natural birth sex ratio" ("Zhongguo" 25).

It is vital to acknowledge the possible repercussions of a large imbalanced gender demographic in China. Without an efficient and effective public policy or cultural change to quell the imbalanced SRB, the trend and the consequences will continue unabated. Scholars within and outside China have parleyed for such a government policy for years, and with the advent of the Care for Girls Campaign (CGC), more scholarly work is needed to critically assess if this "counter wind" is getting to the roots of son preference. Before such policies can be effective, it is vital to continue to understand the correlations and determinants of the skewed SRB.

Determinants of the Sex Ratio at Birth

There are two main origins of the skewed SRB in China: proximal and fundamental. Proximal causes include female infanticide, underreporting and

misreporting of female infants, and sex-selective abortion of female fetuses (Li, Jiang, and Feldman 26). The fundamental causes are the main focus of this paper, and research has been performed on a variety of correlates that argue origins of the skewed SRB. There are three main categories of these correlates: China's family planning policies, areal and spatial anomalies, and socio-demographic conditions (which stem from cultural roots of son preference).

One of the most dramatic and obvious variables that has exacerbated the skewed SRB in China is the One Child Policy. In one study, researchers discovered that the Policy resulted in 7.0 extra boys per 100 girls from 1991–2005. The effect of the policy accounts for 54% of the total increases in sex ratios for the 2001–2005 birth cohorts (Li, Yi, and Zhang 1535). In a model of fertility choice, Ebenstein shows that a three-child policy would reduce the number of "missing girls" by 56% ("Estimating" 783). In another study, he also shows that places with higher fines because of the One Child Policy discourage fertility but are associated with a higher SRB ("The Missing Girls" 87). Other research has produced evidence to suggest that increased levels of SRB are associated with the presence of the One Child Policy (Ding and Hesketh 373; Tang, Teng, and Liou 129). Although there are some speculations that the One Child Policy does not exacerbate the SRB, no quantitative research has been conducted to affirm this position (Nie 12).

Using the 2000 county-level data, many social scientists have sought to explain regional disparities of the sex ratio at birth. In their spatial analysis, Tang et al. discovered that there are high sex ratios at birth in regions with large Han populations, high population densities, high per-capita incomes, large birth orders (births of children

to women who have already had several births), and stricter birth control regulations. After controlling for socioeconomic and ethnic variables, there was clear evidence of "agglomeration" or a "neighborhood effect" (Tang, Teng, and Liou 129). These authors speculate that these neighborhoods may have some kind of social network or common culture that promotes mutual correlation of high sex ratio. Zhang, Laffan, and Zhang affirm this pattern and posit that there are significant nonrandom clusters of biased SRB at the county level, thus signifying that cultural practices and ideas disseminate across county lines into neighborhoods (409). In a study of the child sex ratios, once again, this strong regional pattern was discovered, outlining 6 major clusters of strong sex ratio (Y. Cai 9).

Although this study will not analyze regional variation, it is important to understand that the trend of SRB is transmitted through not only strict family-planning policies but also socio-demographic factors that do not follow county lines. This regional clustering is driven by certain socio-demographic conditions that have not been thoroughly investigated in any regional study. This study attempts to examine some of these factors and their correlations to the SRB at the county level.

Multigenerational Households (%)

One fundamental cause for the skewed SRB is China's local marriage practices, particularly virilocal marriage. In this marriage arrangement, the new wife moves in with her groom's family, adding to the formation of a local patrilineal kinship system. Although neolocal and uxorilocal marriage formations occur, the majority of marriages in China are virilocal (Jin, Li, and Feldman 513). This system, or the practice of

patrilocality, dates back thousands of years in Chinese history but began waning in the mid-1970s. In the early 1980s, although it continued to decline, it did so at a much slower pace than before, indicating that the open up and reform had a conservative influence upon marriage patterns (Lavely 378). This ancient pattern that still persists today is a supporting pillar of son preference and the sex-ratio imbalance.

In a study of three counties in China, Jin et al. discovered a strong link between virilocal marriage and the skewed SRB. Comparing the local marriage customs of virilocal and uxorilocal marriage, they demonstrate that the prevalence of uxorilocal marriage may significantly weaken son preference. For virilocally married couples, son preference is stronger for couples with more sisters, those who had their first child at an older age, as well as those who participated in an arranged marriage (Jin, Lee, and Feldman 511). These researchers suggest that "[w]idespread acceptance of uxorilocal marriage in rural communities could help to resolve the demographic and social problems related to the preference for sons that have been exacerbated under China's sustained low fertility" (Li, Jin, and Feldman, "Uxorilocal Marriage" 51). The government has been actively promoting uxorilocal marriage in some rural areas as of the late 1990s (Li et al., "Imbalanced Sex Ratio" 13).

One of the main functions of virilocal marriage is preserving the economic utility of sons. The foundation for economic assets to "stay in the family" is the inheritance of property by sons, thereby maintaining not only the family's economic situation but also the kinship power in local villages and lineages. In the results of fieldwork in a Henan village, Bossen shows that patrilineal groups preserve power through weak government enforcement of land policies, the devaluation of daughters, and strong organization of

lineages (225). She argues: “There is clearly a relationship between the land system and the son system” (224). Having a son is therefore essential for families to maintain power, prestige, and economic security.

Although a study has been performed showing the connection between patrilocality and the SRB, the only existing research is based on case studies and fieldwork in local areas. To support the existing literature, this study will add significant quantitative statistical analysis at the county level. Although virilocal marriage is not measured directly, multigenerational households (%), or the number of generations living in a household, will be the proxy measurement of the prevalence of virilocal marriage. When a bride moves in with the groom’s family (in the pattern of patrilocality) and have a child, three generations reside within one household (more on this operationalization is found in the Data section and Appendix). Although a multigenerational household could also represent uxorilocal marriage, these family patterns are very rare in China (Li, Jin, and Feldman 51).

Urbanization

In almost unanimous chorus, theorists and researchers have postulated that the sex-ratio imbalance is most prevalent and severe in the rural areas of China (Zhou et al. 1423). China, a historically agricultural society, prefers sons in rural areas due to the need for manual labor and cultural beliefs (such as carrying on the family name) (Lipatov, Li, and Feldman 19171). Others claim that this preference has little to do with desiring more farm hands, but is founded in economic and kinship power held in land acquisition as sons inherit family-held property (Bossen 207-208).

In a comprehensive analysis of the SRB at the town and county levels from the years 1981, 1990, and 2000, Li et al. show that the infant sex ratio has been highest in rural areas but has risen steadily in cities, townships, and the countryside ("Imbalanced Sex Ratio" 28; see Fig. 4). In an analysis of the 1997 National Population and Reproductive Health Survey, the finding of urban-low-SRB association was confirmed as people indicated preference for girls in urban areas and boys in rural areas (Qiao 14). Building on these conclusions, Lei and Pals inquired into the motives behind why son preference is stronger in rural areas. Their results indicate that the desire for sons is explained by lower educational levels and the perception of boys' economic and cultural utilities (27).

Although the attention of the SRB and its surrounding issues has been almost entirely centered on rural areas, there has been recent research indicating that urban areas are also to blame for the high SRB. The abnormal SRB nationwide reflects the gradual rise of the skewed SRB in urban areas (Li et al., "Imbalanced Sex Ratio" 28). As noted before, in a spatial analysis at the county level in 2000, the SRB levels were indeed high in urban areas (Tang, Teng, and Liou 129). The degree to which urbanization has affected the SRB has not yet been studied at the county level.

In-Migration

According to the 2010 Census, there were upwards of 221.43 million floating migrants in China. The majority of them are rural-to-urban migrants who come from rural locations to seek employment opportunities in urban and developing areas. Since the beginning of the opening and reform era in the late 1970s, the strict limitation on spatial

mobility has been gradually relaxed, as has the household registration (*Hukou*) system. Because of this policy relaxation, plus widened urban-rural socioeconomic gaps, China witnessed an unprecedented rural-to-urban population movement that has been ongoing for decades, resulting in a total of about 340 million unofficial "urbanites" with rural *Hukou* by 2009 (Chan, "China").

The influx of migrants has altered the economics and culture of urban areas, signaling the economic development levels and impacting key demographic features in the migrant-destination areas. An analysis of the Fifth Population Census has shown that to some extent, the son preference tradition among rural-urban migrants has resulted in increased levels of SRB in urban areas (Wu, Li, and Yang 11). In a survey of migrants in Shenzhen, attitudes of son preference were unchanging even after in-migration. Although these attitudes exhibit moderate to low son preference, actual migrant behavior shows severe son preference, with the SRB of migrants living in urban areas reported at 163 (Wu, Jin, and Li 238).

According to the Shenzhen study, one viable explanation for the high SRB in urban locations is the rate of rural to urban migration. These millions of migrants may be bringing their rural culture and attitudes with them into their new work environments, causing the SRB to become more skewed in urban areas. A postulation about in-migration impact upon SRB can be formed based on current census data. According to my measure of in-migration in 2010, on average 10% of each county population is comprised of in-migrants. Because there is no information about specific birth rates among in-migrants separated from other *Hukou* types, it is impossible to include this in the equation. Therefore, the birth rate of in-migration is weighted the same as other

Hukou holders. Extrapolating from the Shenzhen study, if each group of in-migrants maintains this high 163 SRB after migration, and the overall average SRB is 115.3, then the SRB of the nonmigrant population would be 110. Because this in-migration SRB is derived from one case study and we do not have birth rates disaggregated by *Hukou*, there is a limitation on this extrapolation, thus presenting the opportunity for a quantitative study to verify the plausibility that in-migrants do affect the SRB of a whole county.

Concentration of in-migrant residents may also indicate the development of a vibrant, rapid economy. Some have postulated that this swift transformation of the economy could influence son preference (Zeng et al. 291). Eklund found that socioeconomic development has differing impacts upon son preference, weakening it in some areas, while sustaining it in others (47). Therefore, it seems in-migration might have ambivalent impacts on SRB. On one hand, it may increase SRB due to larger proportion of urban residents who have carried their son preference rooted in their rural upbringing. On the other hand, in-migration also signals socioeconomic opportunities and less traditional cultures with weaker son preference and may appear negatively linked to SRB in a cross-sectional analysis.

My study will answer two key questions regarding the SRB and the impact of migrants upon urban societies. First, it investigates the plausibility that in-migrants continue to maintain traditional attitudes of fertility after migration in a county-level study. Secondly, the study will analyze the correlation of the percentage of migrant population and the SRB at the county-level. This will substantially add to the limited data available in the literature on migrant populations and fertility behaviors.

Education and Illiteracy

All across China—rural, urban, developed, undeveloped, Han ethnic groups, or ethnic minorities—the education levels of both males and females have been increasing over the past four decades. Despite this marked improvement, there is still a distinct gender gap pronounced for those who are illiterate and highly educated, representing the two extremes in educational attainment ("Gender Gaps in China" 2). In both areas, females lag behind, indicating a consistent difference in attainment of education over three decades. These differences in adult illiteracy rates and higher education levels reflect gaps in basic socioeconomic development.

Without accounting for gender, attitudes of son preference are generally weakened by higher educational levels at a national level (Liang 25; Qiao 14). On the other hand, the higher the education levels among rural-urban migrants, the higher the risk of son preference and also the higher probability of choosing to have a boy during a second pregnancy (Wu, Jin, and Li 241). However, when research accounts for education rates among males and females separately, there is evidence that the gender gap in education does impact son preference. Edlund found that parents (men, relative to women) with a good education have higher sex ratios in their offspring (7). They also discovered that in areas with higher sex ratios, men invest more heavily in education. However, women's educational attainment decreases in these areas, indicating the possibility that this investment is only given to male sons. According to China's 2000 census, the educational level of females was positively correlated with the SRB (Banister 36). Another study found that in poorer regions with high prevalence of uxorilocal marriage, women with higher education levels have stronger son preference (Jin, Li, and

Feldman 528). Education, therefore, has mixed effects upon the SRB.

This study will add to the limited body of literature on the correlation of the gender gap in education and illiteracy to the sex ratio at birth. Accounting for the synchronized increase in both male and female education rates across the last two decades, this study will examine whether the gender gap in the education and illiteracy rates have a positive or negative correlation to the sex ratio at birth. This will answer the question of whether a larger educational gap between males and females over two decades is positively or negatively correlated to the SRB.

HYPOTHESIS

Aside from urbanization, I hypothesize that factors positively linked to sex-ratio imbalance are those reflecting the presence of the devaluation of women, including concentration of multigenerational households, the migrant population (who may hold traditional fertility attitudes), and the gender difference in illiteracy and gender difference in college enrollment.

Hypothesis (H) 1: Multigenerational Households (%): the percentage of multigenerational households living in a county will have a positive correlation to the SRB.

Theory (T) 1: A multigenerational family indicates virilocal marriage and is a proxy variable for the practice of patrilocality. Patrilocality significantly decreases the status of women (Coltrane 1068). Although no quantitative research has been completed about the impact of multigenerational households (%) on the SRB, there is research about virilocal versus uxorilocal marriage patterns. When there is a change in marriage practices from virilocal to uxorilocal, the community which becomes more dominantly ruled by uxorilocal marriage significantly decreases the SRB (Li, Jin, and Feldman, "Uxorilocal Marriage" 51). Therefore, the concentration of these multigenerational homes that generally practice virilocal marriage will have a positive correlation to the SRB.

H2: Urbanization: urbanization will have a negative correlation with the SRB.

T2: According to a plethora of research about rural China, son preference and its accompanying traditions will exacerbate the SRB (Edlund 1285). Therefore, counties that are more rural will have populations with strong son preference that are therefore more willing to abort baby daughters. Although urban locations will still have a skewed SRB, the modern culture will weaken son preference at a higher rate than in rural areas.

H3: In-Migration: the influx of migrants will have a positive correlation or a negative correlation to the SRB, depending on which theory prevails.

T3**:** As indicated from case studies of rural-urban migrants, these migrants bring a culture of strong son preference with them (Wu, Jin, and Li 229). These attitudes do not change from rural to urban areas; therefore, the greater the migrant population in an area, the stronger the likelihood that the SRB will be high. Another possible explanation for a migrant population correlated negatively to the SRB rate is the indication of an economy in rapid transformation (Zeng et al. 291). Two opposing forces – traditional migrant behaviors and rapid economic development - may be in place when predicting the SRB correlation outcome.

H4: Gender Difference in College Enrollment and Gender Difference in Illiteracy: the gender difference in college enrollment and the gender difference in illiteracy will have a positive correlation to the SRB.

T4: Though the rates are all falling across the two decades, there is still a significant gender gap in higher-education and illiteracy between males and females, with men receiving better education than women. The counties with the largest gap when comparing male and female rates will also have a higher SRB. This gap in education and illiteracy indicates a general lack of development in socioeconomic areas ("Gender Gaps

in China" 2). It can then be surmised that as women in these areas lag behind men in education, they also lag behind in social capital, money, and power. As women's social status in these areas is lower, so too is their power in the fertility decision-making process (Mason 732).

METHODS

Data

The data used in this study come from the China 2000 and 2010 County Population Census Data ("China"). The unit is measured at the county-level (县市 xianshi), including district (区 qu), county-level cities (县级市 xianjishi), county (县 xian), and banner (旗 qi) (see Sample Description in Table 2). The details by percentage of counties included in each province used in this analysis are in the Appendix. In Model A (2000-2010), 96.9% of all counties were included and in Model B (2000 and 2010), 99% of all counties were included.

The county-level censuses give wide-sweeping, universal coverage of China at a localized level. The strength of a large amount of units—over 3,000 counties—is an advantage in drawing conclusions of a statistical, correlative nature. Because of the strength of a census sample collection, the data can be generalized across the population. These censuses also present one of the only "independent" accounts of data not intended for People's Republic of China (PRC) government assessment, ensuring fewer biases in practices of data collection and reporting. One clear drawback to only using two census years is that the data collected only captures two points in time, thus limiting some forms of longitudinal analysis.

Table 2

Sample Description 2000–2010

Sample Sizes	2000 Sample	2010 Sample
A=3,171 County Units (equivalent county units across 2000 and 2010) B=3,243 County Units (2000), 3,244 County Units (2010)	Mean Standard Deviation Minimum, Maximum	Mean Standard Deviation Minimum, Maximum
Sex Ratio at Birth		
A	N/A	115.37 10.75 76.47, 176.74
B	115.46 13.23 63.16, 193.16	115.38 10.75 76.47, 176.74
Multigenerational Households (%)		
A	19.10 7.10 1.93, 54.81	N/A
B	19.10 7.10 1.93, 54.81	18.66 8.00 1.17, 55.30
Gender Difference in Illiteracy		
A	-9.73 6.80 -52.42, 0.71	N/A
B	-9.72 6.75 -52.42, 0.71	-5.44 4.33 -38.37, -0.09
Urbanization		
A	37.7 30.14 0, 100	N/A
B	38.25 30.46	47.09 24.82

Table 2 Continued

Sample Sizes	2000 Sample	2010 Sample
A=3,171 County Units (equivalent county units across 2000 and 2010) B=3,243 County Units (2000), 3,244 County Units (2010)	Mean Standard Deviation Minimum, Maximum	Mean Standard Deviation Minimum, Maximum
	0, 100	1.40, 100
Gender Difference in College Enrollment		
A	2.69 2.25 -1.77, 21.55	N/A
B	2.72 2.27 -1.77, 21.55	2.40 2.52 -21.41, 17.74
Percent of Migrant Population		
A	5.78 8.45 0.10, 91.20	N/A
B	5.92 8.57 0.10, 91.20	10.12 13.00 0, 89.90

Although the China censuses generally present credible data, issues with the quality of the data must be noted. One important strength of the 2000 census data is that the collection included permanent *and* temporary populations at the county level, thus giving a greater insight into migrant behavior. Although the census accounts for differences in migration patterns, there are serious problems in aggregating the migration numbers (Chan, "Chinese Census" 5). The undercount rate is 1.81% (22.46 million), with serious underreporting of infant girls (Chan, "Chinese Census" 6). Cui, Xu, and Li compare the 2000 census data to the 2010 census and conclude that "the overall quality of the [2010] census data has been apparently improved" (10). The 2010 census data by sex were historically consistent and the undercount rate of the total population was improved. The data of educational attainment was also in line with official education department records, and the structure of the data from the long form can be generalized to the population (Cui, Xu, and Li 10). The limitations of the 2010 census consist of underreporting of the younger population (ages 0–9), including an underreporting of births. This could imply that the SRB is in fact lower than the recorded censuses. There is a potential problem with this inflated sex ratio, but some undercounting does not necessarily lower the significance of the very high sex ratios recorded in the majority of the counties. In addition, the 20–45 age range was both undercounted and overcounted (Cui, Xu, and Li 10; Wang and Ge 22). It is important to note these limitations when examining the findings from these two census records.

Measurement

Because it is difficult to directly measure the concept of patriarchy, I use societal conditions as an alternative source to gauge and indicate patriarchal norms. The variables— multigenerational households (%), urbanization (decrease in traditional values), in-migration, and gender difference in college enrollment and gender difference in illiteracy —can reflect these norms and present a theoretical framework to predict possible correlation to the SRB (see Chart 2 for Operationalization). See Table 3 for conceptual definition of the variables.

There is no direct measure of marriage formation patterns (such as virilocal versus uxorilocal) in the census; therefore, the prevalence of multigenerational families is used as a proxy for virilocal marriage. The majority of multigenerational households were formed via virilocal marriage, especially in rural areas (which is less true in urban areas where older parents are more likely to live with their adult daughter). Prevalence of multigenerational households is by no means a perfect measure as Li, Feldman, and Jin point out that some parents (of the groom) choose to live alone with one of their sons or rotate amongst sons or live with their married daughter's family ("Marriage Form" 514). And yet, if there is a presence of large clusters of multigenerational families within counties, it indicates a concentration of a kinship system, which is rooted in son preference (Bossen 224).

Education is measured by two variables, representing two ends of the educational distribution. The gender difference in illiteracy is mainly a gauge of the gender gap amongst the elderly population and a snapshot of a traditional, older China. According to the World Bank, the rate of illiteracy for male adults declined from 21% in 1982 to a

Table 3

Conceptual Definition of the Variables

Variable	Definition
Sex Ratio at Birth (SRB)	SRB is a ratio of number of males aged 0 to 1 versus number of females aged 0 to 1
Multigenerational Households (%)	Household composition is measured by the percentage of extended households with 3 or more generations living together
Gender Difference in Illiteracy	Illiteracy is the percentage of those who are illiterate in each county. The difference between males and females is calculated.
Gender Difference in College Enrollment	Education is measured by the percentage of individuals who received some college-level education or higher among the population aged 15–45. The difference between males and females is calculated.
Urbanization	Urbanization is measured by the percentage of urban population within each county
In-Migration Population	The total percentage of migrants living in a county. These migrants include those people who moved into this county from other counties in the same province or other counties from a different province.

mere 5% in 2000, and the rate for women declined from 49% in 1982 to 13% in 2000. This indicates that the female rate is dropping faster than the male rate. This study will add to these data and also include the 2010 gap. Looking at the difference in higher education gives a representation of the gender gap within the population aged 20–44 (the age at which the majority of students start higher education). Urbanization is measured by the percentage of the population within a county who hold an urban *Hukou*. In-migration

is measured by percentage of in-migrants within a county. Only migrants who moved into a county from other counties in the same province or other counties from a difference province were included, as people moving within the same county may not provide accurate results. This measure does not capture the outflow of migrants.

Statistical Approach

Ordinary Least Squared (OLS), regression analysis was performed to examine the associations between SRB, continuously measured, and the covariates. The regression coefficients show how much the Sex Ratio at Birth (Dependent Variable; DV) changes corresponding to one unit change in a covariate (Indepndent Variable; IV). A panel data regression analysis was also run with the 2000 and 2010 data. This analysis added a regional covariate, "Province" that was analyzed as a cluster variable. The type 1 error probability at which significance is determined is 0.05, but 0.01 and 0.001 are also recorded.

Logistic regression modeling was also performed to examine the associations between SRB, dichotomously measured, and the covariates. The cutoff point for the logistic analyses is 112.47 in 2000 and 113.68 in 2010, above which the sex-ratio imbalance is considered extremely high. The log odds of the outcome is modeled as a linear combination of the predictor variables. The type 1 probability at which significance is determined is 0.05, but 0.01 and 0.001 are also recorded.

RESULTS

See Tables 4–6 for detailed results. Statistical significance is found at the .05 level.

H1 Results: Multigenerational Households (%)

The results for multigenerational households (%) are mixed. The cross-sectional results using data from the 2000 and 2010 census, respectively, confirm my hypothesis. Results from cross-sectional OLS analyses based on the 2010 data show that one unit increase in the percentage of multigeneration extended households is associated with a .09 unit increase in sex-ratio imbalance, controlling for other covariates. Results from the logistic analyses based on the 2010 data show that one unit increase in the percentage of multigeneration–extended households is associated with 1.01 higher likelihood of the county's having an extreme sex ratio imbalance defined by the preset cutoff point of 112.47, controlling for other covariates. The percentage of multigeneration–extended households in 2000 is negatively associated with the level of sex-ratio imbalance and the likelihood of the county's having an extreme sex ratio imbalance in 2010.

H2 Results: Urbanization

The results for urbanization are consistent in terms of the direction but the magnitude varies. All the results suggest that urbanization is a negative covariate of SRB,

Table 4

County-Level Results Predicting Sex Ratio at Birth (SRB), Year 2000

	Models	
Variables	OLS Analysis	Logistic Analysis
Multigenerational Households (%)	0.07*	0.02**
Gender Difference in Illiteracy	0.20***	0.03***
Urbanization	-0.10***	-0.02***
Gender Difference in College Enrollment	0.90***	0.14***
Percent of Migrant Population	-0.06	-0.003
Sample Size	3,243	3,243
R-squared	0.04	0.03

*p < 0.05; **p<0.01; ***p<0.001

Table 5

County-Level Results Predicting Sex Ratio at Birth (SRB), Year 2010

	Models	
Variables	OLS Analysis	Logistic Analysis
Multigenerational Households (%)	0.07*	0.01*
Gender Difference in Illiteracy	-0.06	-0.02
Urbanization	-0.02	-0.004
Gender Difference in College Enrollment	0.78***	0.14***
Percent of Migrant Population	-0.06*	-0.007
Sample Size	3,244	3,244
R-squared	0.06	0.03

*p < 0.05; **p<0.01; ***p<0.001

Table 6

County-Level Results—Year 2000 Covariates Predicting 2010 SRB

Variables	Models		
	OLS Analysis	Logistic Analysis	Panel Analysis (Provincial Cluster)
Multigenerational Households (%)	-0.09**	-0.02**	0.03
Gender Difference in Illiteracy	-0.08*	-0.02**	0.2
Urbanization	-0.08***	-0.02**	-0.07**
Gender Difference in College Enrollment	0.84***	0.18***	0.55***
Percent of Migrant Population	-0.05	0.002	0.05
Sample Size	3,171	3,171	3,171
R-squared	0.04	0.03	0.04

*p <0.05; **p<0.01; ***<0.001

although results are not significant in the 2010 analysis. Results from cross-sectional OLS analyses based on the 2010 data show that a one unit increase in the percentage of urbanization is associated with a .08 unit decrease in sex-ratio imbalance, controlling for other covariates. Results from logistic analyses based on the 2010 data show that a one unit increase in the percentage of urbanization is associated with a 1 higher likelihood of the county's having an extreme sex ratio imbalance defined by the present cutoff point of 112.47, controlling for other covariates. When the Province cluster variable was part of the panel data analysis, urbanization had a positive correlation with the SRB.

H3 Results: In-Migration

Results from cross-sectional OLS analyses based on the 2010 data show that a one unit increase in the migrant population is associated with a .06 unit decrease in sex-ratio imbalance, controlling for other covariates. However, in all other models, in-migration is not a significant covariate of sex-ratio imbalance.

H4 Results: Gender Difference in College Enrollment and Gender Difference in Illiteracy

The results for difference in illiteracy are mixed. When analyzing the 2000 data, my hypothesis is confirmed; however, the results from the 2010 analysis show no significant effect, and the 2000-210 results failed to corroborate my hypothesis.

The results for gender difference in college enrollment were consistent. Hypothesis 4 was confirmed in all models. Results from the 2000-2010 OLS analysis show that a one unit increase in the gender difference in college enrollment is associated with a .84 unit increase in sex-ratio imbalance, controlling for other covariates. Results from the 2000-2010 logistic analysis show that a one unit increase in the gender difference in college enrollment is associated with a 1.2 higher likelihood of the county's having an extreme sex ratio imbalance defined by the preset cutoff point of 113.68, controlling for other covariates. When the Province cluster variable was part of the panel data analysis, gender difference in college enrollment had a positive correlation with the SRB.

DISCUSSION

Many of these variables that are being examined have not been studied before in relation to the SRB.

Multigenerational Households (%)

The results from the year 2000 and 2010 alone indicate a positive correlation of multigenerational households (%) to the sex ratio at birth. Results from the 2000 covariates predicting the 2010 SRB data reported the reverse—there was a negative association of multigenerational households (%) to the sex ratio at birth. This presents a limitation in drawing conclusions when the year 2000 covariates predict the 2010 SRB.

There are possible empirical and conceptual reasons that explain the inconsistent findings between the positive and negative effects, but it may be impossible to identify the exact underlying issue. The sample size of the longitudinal analysis is indeed smaller, the measurement errors might be systematically different in the two census years, or it could be a possible statistical artifact. Conceptual reasons include the real possibility that the effect is not lagged but more instantaneous, thus looking at a 10-year lagged effect may not be appropriate. Multigenerational households are not increasing generally over the decade; therefore, this variable can only fall (not rise). Therefore, the percentage of multigenerational households a decade ago may have not affected the SRB in the year 2010. Another possible explanation is that multigenerational households (%) may not

actually correlate with the SRB in all cases. Further research needs to investigate these mixed results.

There has been no prior research studying multigenerational households in relation to the SRB. The findings from the 2000 and 2010 models corroborate previous research and my hypothesis. Jin et al. conducted research in three rural counties of China examining the effects of a switch from virilocal to uxorilocal marriage patterns. They found that uxorilocal marriage may weaken son preference (Jin, Lee and Feldman 511). Although "[t]he traditional norm of the large extended family is no longer observed by most young people," the majority of marriages are still virilocal (Li, Feldman, and Jin, "Marriage Form" 96). According to the bulk of my results, as trends increase away from virilocal marriage, a decrease in the sex ratio at birth may ensue. This would support the idea that patrilocality and the kinship system are fertile grounds for strong son preference.

The position that multigenerational households are a direct cause of the SRB is fraught with complexities. According to census data, the rate of coresidence, or percentage of seniors 65 years old or over who live with their children, was 70% in 1980 but dropped to 65% in 2000 (Yasuda et al. 704). The prevalence of multigenerational households is likely a proxy for cultural values that, in current Chinese settings, encourage son preference which then leads to the imbalance in the sex ratio. The relationship includes possible interaction effects as well, such as the strong link between rural areas and multigenerational prevalence. Another important factor to consider is how coresident multigenerational households are established. Virilocal marriage is only one way in which families are formed in modern China. For instance, some adult daughters will move back in with their parents to provide care (thus forming a multigenerational

household), and many of these situations may simply have no causal link to the SRB. Although multigenerational families are formed in many ways, according to recent research couples' coresidence rates were much higher with husbands' parents (Yasuda et al. 706).

Despite these complexities, the research has shown that changing marriage patterns (and thus family patterns) do have an effect upon the SRB generally and the PRC government has taken notice. Policies have already been implemented to encourage uxorilocal marriages in select rural counties, such as regions in Hubei and Gansu Provinces. As part of the program, the government has been providing more social security and pensions to the elderly with the hopes of providing alternatives for "no-son" families (Li, Jin, and Feldman 62). In the report on these government efforts, findings indicated that a switch to uxorilocal marriage from virilocal marriage alleviated son preference and improved female child mortality and women's status within the family and society (Li, Jin, and Feldman 51). The Care for Girls Campaign (CGC) has to some extent promoted uxorilocal marriage. In Hebei Dingzhou City, where this program has been implemented, there were three outcomes: the switch to uxorilocal marriage overcame elderly care problems; the societal position of women increased; and the sex ratio was reduced— of the families participating, 65% became daughter-only households ("Guanai" 17).

Although these are optimistic findings, son preference has only perhaps been postponed one generation; therefore, the government ought to encourage couples to avoid virilocal marriage and multigenerational household dwellings in a more comprehensive manner. While there is no evidence that daughter preference occurs in uxorilocal

marriage, there is evidence suggesting a weakening of the patrilineal system. In an investigative report on the outcomes of the CGC, it was found that "having a son increases a family's power" (生儿子就成为增加自家的"势" sheng erzi jiu chengwei zengjia zijia de "shi") and this power is rooted in virilocal marriage (Chen 陈 373). This report suggests that the CGC ought to give greater focus to changing marriage patterns. According to this study's findings, policies ought to aim at changing marriage patterns, but be directed more towards forming nuclear families as this arrangement can lower the SRB but also sustain gender equality.

The rate of coresidence has been declining in China, Japan, South Korea, and Taiwan. Of all four Asian countries, South Korea has experienced the most rapid decline in coresidence from 80% in 1980 to 50% in 2000, with nuclear family reformation replacing multigenerational households (Yasuda et al. 704). The rate of coresidence in South Korea becomes 1.5 times higher with couples who have East Asian religious beliefs, 3 times higher in rural areas, and the number one predictor is whether the husband is the eldest son (Yasuda et al. 729; Tsuya and Bumpass 71). On the other hand, couples whose wife has high educational attainment and who have a 'love-marriage,' or a companionate, equal marriage are much more likely to form nuclear families (Yasuda et al. 728). Results show that a cultural shift, rather than just modernization, is the prime factor in the movement toward nuclear families. In this same time frame of transition, South Korea has declined in Confucianism and coresidence and the SRB has fallen from 116.5 in 1990 to normal levels in 2013. Chinese policy makers ought to look at South Korea's example and focus on decreasing cultural factors such as Confucianism and the son system while promoting nuclear marriage, women's high educational attainment and

companionate, equal marriage.

Urbanization

Results in both the year 2000 and the 2000–2010 models show a negative correlation of urbanization to the SRB, but there was no statistical significance for the year 2010. Although the 2000 and 2000–2010 models were consistent with the literature, the results for urbanization for 2010 were unexpected. According to the literature, the urban and rural divide plays a consistently strong role in the high SRB (Zhou et al. 1423). Although there is a plethora of research showing that rural areas generally have more severe SRB rates in China, this is the first research to correlate urbanization and the SRB at the county level in a regression analysis. As expected, urbanization may indeed weaken son preference, and there is a negative correlation with the SRB. With the drastic increase of the SRB in urban areas from 2000 to 2010, urbanization did not weaken (or strengthen) son preference in 2010. The 2010 findings may indicate that urbanization is not a "cure-all" to the ills of son preference but rather tempers the SRB.

The PRC government has recognized that the SRB is high in rural areas and has constructed its policies around this idea. At the 10th Chinese Women's National Congress in 2003, Pan Guiyu, vice minister of the State Population and Family Planning Commission, declared that "the unbalanced sex ratio has become the most important problem in rural China" (qtd. in Y. Cai 18). Although the CGC is now supposedly operational nationwide, the focus of the Campaign is directed mainly to rural areas in these counties. The CGC goal in Fushan County is to help 1,100 rural "daughter-only" homes. Dan Dan, a young girl from Fushan County, received free school tuition, and her

mother received a free check-up and a small loan ("Guanai" 18). In Anhui Province, the CGC is giving priority to rural homes, and in Guizhou, Suiyang County, rural "daughter-only" households are receiving retirement stipends ("Guanai" 52).

According to my results, targeting the rural areas of China with these policies is indeed helpful, but turning a blind eye to urban areas may be detrimental. As the census data show, the SRB in urban areas in 2010 was 118.33, slightly more than *rural* areas in 2000 (see Fig. 4). My findings also indicate that in 2010, urbanization had no effect upon the SRB. Urban areas ought to implement a policy that targets son preference and the high SRB by catering to the needs of the upper middle, educated class of Chinese. One researcher pointed out: "It is … a much more politically sensitive issue to tackle sex-selective abortion among the middle and upper classes than to combat female infanticide and neglect among the rural poor" (Attané 5). Lai suggests that more developed areas in China should provide social institutions, such as retirement arrangements, to families that have an only daughter (324).

Gender Difference in College Enrollment

Of all the covariates in this study, the gender difference in college enrollment revealed the most conclusive findings, with a positive relationship to the SRB at the 0.001 significance level. These findings indicate that in counties with a large gap in male and female education (comparative to other counties), the SRB is higher. For example, in Fuzhou city (福州市 fushou shi), there is a 17.74% gap between males and females in higher education, and this county has one of the highest SRB rates at 123.28. In the research of Edlund et al., they found that more educated parents have higher sex ratios in

their offspring due to sex selection (7). There has been no prior research investigating the gender gap in education and the SRB.

Research has shown that a simple increase in women's education is "[u]nlikely to ameliorate the shortage of girls in China or India" (Li, Zhu, and Feldman 95). The results of this study concur with this assertion, but maintain that it is the *difference*, or the gender gap, between men and women in higher education that could possibly predict the SRB at the county level. This obvious gender difference in college enrollment is a reflection of the treatment of boys and girls in Chinese society. Croll explains that "[s]ons, positioned between ancestors and descendants of past and future and bonded permanently into the chain of generations and the sources of support in old age, continued to receive messages denoting privilege and preference" (95). In the counties with a higher gender difference in college enrollment, this gender gap indicates preferential treatment in the allocation of resources, specifically education, toward sons (Edlund 7).

The Care for Girls Campaign has implemented a pilot program in Fujian that gives free tuition to female students from poor families and families with two girls. An assessment of the plan found that the "limited scope of the program has reduced its [the policies] impact" (Tan 20). In Beijing, the CGC began the "Beijing Sunshine" program which provides tuition to girl students and spent approximately $131,628 (US) in 2008 ("Guanai" 1). On the other hand, Anxi is one of only 24 cities in all of China where girls are actually receiving financial aid, indicating a limited budget to girl's education.

Although these programs are admirable, they are limited in scope and, according to this study, do not target the correct population that would effectively influence the SRB. According to the literature, an increase in education of girls and women in China

will have little to no effect upon son preference (Li, Zhu, and Feldman 95). My findings conclude that the CGC educational funds and programs ought to target women in counties who have a high *difference* of college enrollment between men and women. Indeed, in areas where sons are given preferential treatment, women lag behind in both education and social position.

In-Migration

Except for the analysis in 2010, the results for in-migration were consistent across all models and years: there was no statistical significance between in-migration and the SRB. These findings fail to verify my hypothesis, indicating that there is no significant effect of migration on SRB. According to the Shenzhen study, rural-to-urban migrants maintained strong son preference after in-migration, and in that particular area, the SRB among migrants was 163 (Wu, Jin, and Li 238). This is the first study to investigate the relationship between in-migration and the SRB at the county level.

There are two possible explanations that clarify why my findings do not corroborate the current literature about fertility behaviors of in-migrants. First, it is apparent that the concentration of migrants living in an area does not statistically correlate with the SRB. Research shows that 90% of marriage and family formation occurs in home counties, even if these individuals have migrated before their marriage (NSF Grant Proposal). Thus, the birth of sons or daughters born to these rural *Hukou* holders usually takes place in the rural home county, not the destination of migration. Second, areas with high concentrations of migrant workers usually indicate a vibrant, booming economy. The culture of such an area is usually more progressive and has

weaker son preference, thus presenting an opposing force to migrant fertility attitudes. When these two contrasting powers emerge in one area, the result could account for a null effect upon the SRB.

Further Research

Because the R-squared values are low, the model's explanatory power is not as high as preferred. Other variables that would have been desirable to consider include GDP, ethnicity, the strictness of the One Child Policy, healthcare discrepancies by gender, the gender wage gap, and types of employment based on gender. These indicators were unfortunately not included in the census. Another essential element that needs further research is the out-migration population, or in other words, an investigation into how son preference is affected after large cohorts of migrants leave home counties.

Further research ought to be done that shows the effect of multigenerational households (%) over a longer period of time. Case study work looking at multi-generation households and son preference may uncover significant pattern related to family power and the kinship system. Some questions that still need answers include: Does uxorilocal marriage promote daughter preference, and does it provide a long-term solution? Does a change in marriage patterns promote gender equality? What are the underlying mechanisms of patrilocality (and multigenerational households) in present-day China that lead to son preference and the decision to abort a baby daughter? What forms of policy would promote greater gender equality in marriage and family?

By only looking at one tier of education, there are limitations to applying these conclusions to all levels of education. Further research ought to look at the gender

difference in other forms of education, such as middle school and high school. To investigate the theory of preferential treatment and its association to the SRB, other socioeconomic indicators of preferential treatment of sons—such as gender pay inequity and gender gaps in health care, employment, suicide, etc.—ought to be explored. Additional research needs to be conducted that looks at the effects of urbanization on the SRB, particularly after the year 2010. Also the CGC ought to explore policies that could target urbanites, where there is an alarming increase in the SRB.

CONCLUSION

Key Findings and Implications

1. Other than one model, a positive relationship was found with the concentration of multigenerational households in correlation to the SRB. Patrilocality and associating practices—such as son land inheritance and continuation of the patrilineal line—are indicative of a "son system" which exacerbates the SRB. Policies ought to be put into place that focus on decreasing cultural factors such as Confucianism and the son system while promoting nuclear marriage, women's high educational attainment, and companionate, equal marriage.

2. Results from this study show that in-migration has a null effect, with only one model showing any statistical significance. These results conflict with research that shows high son preference amongst migrant workers. There are two possible explanations: first, migrants come to urban areas for work but get married and have children in their home counties; and second, a booming, vibrant economy (which has a high concentration of migrant workers) indicates more progressive fertility attitude. These opposing forces may create an environment in which the migrant population is not statistically correlated with the SRB.

3. Other than one model, urbanization has a negative relationship to the SRB. In 2010 urbanization had no statistical significance to the SRB, indicating that urbanization

did not weaken (or strengthen) son preference in that year. Policies, such as the Care for Girls Campaign, need to be directed to rural *as well as* urban areas.

4. Across all models and all years in this study, the gender difference in college enrollment has a positive correlation with the SRB. Levels of education for males or females are not the deciding factor but rather the gender gap between men and women. As women lag behind men in higher education, there is evidence of preferential treatment given to sons. Essentially, how local society treats women (if they are viewed as equals or not) is the key determinant in this study to the SRB. Policy ought to look at the gender *gap*, as opposed to just improving women's education in general, and continue to improve women's social status.

APPENDIX

Table 7

Model A – Year 2000-2010 (3,171 counties, based on 2010 county lines)*

Province	**Percentage of Counties**	**Province**	**Percentage of Counties**
Beijing	100%	Hubei	96.6%
Tianjin	94.4%	Hunan	100%
Hebei	100%	Guangdong	93.1%
Shanxi	100%	Guangxi	92.8%
Inner Mongolia	100%	Hainan	78.6%
Liaoning	100%	Chongqing	100%
Jilin	100%	Sichuan	99%
Heilongjiang	97.9%	Guizhou	98%
Shanghai	95%	Yunnan	96.6%
Jiangsu	94.2%	Tibet	100%
Zhejiang	98%	Shaanxi	100%
Anhui	97.6%	Gansu	96.1%
Fujian	97.9%	Qinghai	94.5%
Jiangxi	100%	Ningxia	89.3%
Shandong	98%	Xinjiang	97.3%
Henan	98.3%		

*Some counties were excluded from this model as boundary changes and dissolution of counties over the decade (2000 to 2010) prevented a perfect equalization of county units

Table 8

Model B – Year 2000 (3,243 total counties)

Counties Excluded:*
塘沽区
汉沽区
西沙群岛
南沙群岛
中沙群岛的岛礁及其海域

*Only five counties were excluded from this study due to lack of data. For the year 2000, 99.8% of counties were included in analysis.

Table 9

Model B – Year 2010 (3,244 total counties)

Counties Excluded:*
西沙群岛
南沙群岛
中沙群岛的岛礁及其海域
青岛市

*Only four counties were excluded from this study due to lack of data. For the year 2010, 99.9% of counties were included in analysis.

Table 10

Operationalization of the Variables – Data from the China 2000 and 2010 County Population Censuses

Sex Ratio at Birth	a) Raw data from Table 2 b) Measured at zero years of age, male and female ("0" 岁，男，女) c) Calculations: (Male/Female) x 100, rounded two decimals = Sex Ratio at Birth
Multigenerational Households (%)	a) Raw data from Table 1 b) Measured as Household Category, including 3rd and 4th generations plus living in one household. [家庭户类别, (户), (三代后)，(四代以上户)] c) Calculations: (Third Generation + Fourth Generation and above) / Total Households (Table 1, Family Household Total [家庭户, 户数（户）]) = percentage of 3rd and above generation households in each county
Gender Difference in Illiteracy	a) Raw data from Table 4 b) Measured as the difference between percentage of male illiteracy and female illiteracy (文盲率, 男), (文盲率, 女)

Table 10 Continued

Gender Difference in Illiteracy	c) Calculations: percentage of male illiteracy – percentage of female illiteracy
Urbanization	a) Raw data from Table 1 b) Measured as City and Rural populations (城乡人口[人], 城镇, 乡村). c) Calculations: (City / [City + Rural] = Urban Variable / Rural / [City+Rural] = Rural Variable). = percentage of urban versus residents in a county
Gender Difference in College Enrollment	a) Raw data from Table 4 b) Measured as males and females in technical college, undergraduate college, graduate college (大学专科, 大学本科, 研究生) c) Calculations: 1. Male technical college + undergraduate college + graduate college = total males in higher education. 2. Total males in higher education / total male population aged 15–44 = percentage of males in higher education 3. Female technical college + undergraduate college

Table 10 Continued

Gender Difference in College Enrollment	+ graduate college = total females in higher education. 4. Total females in higher education / total female population aged 15 –44 = Percentage of females in higher education 5. Percentage of males in higher education – percentage of females in higher education = Difference in Education
Percent of Migrant Population	a) Raw data from Table 3 b) Measured as Shifting Population, including populations from other counties within the same province and populations from other provinces (迁入人口[人], 本省其他县[市]、市区, 外省) c) Calculations: 1. Population from other counties within the same province + populations from other provinces = total migrant population in a county. 2. Total migrant population / total county population (Table 1, Total Population, Total (总人口[人]，合计) = percentage of migrant population in county

Table 10 Continued

Province	A cluster variable to indicate difference in region. Each county was assigned a number based on Province. (e.g., all counties in HuNan province are assigned 15)

SELECTED BIBLIOGRAPHY

Attané, Isabelle, and Christophe Guilmoto. *Watering the Neighbour's Garden: The Growing Demographic Female Deficit in Asia*. Paris: Committee for International Cooperation in National Research in Demography, 2007. Print.

Banister, Judith. "Shortage of Girls in China Today." *Journal of Population Research* 21.1 (2004): 19–45. Print.

——."BBC NEWS | Asia-Pacific | Has China's One-child Policy Worked?" *BBC News - Home*. BBC News, 20 Sept. 2007. Web. 10 Dec. 2011. <http://news.bbc.co.uk/2/hi/7000931.stm>.

Bossen, Laurel. "Missing Girls, Land and Population Controls in Rural China." *Watering the Neighbour's Garden: The Growing Demographic Female Deficit in Asia*. Ed. Marcus W. Feldman. Paris: Committee for International Cooperation in National Research in Demography, 2007. 207–28. Print.

Cai, Yong. "Child Sex Ratios and Their Regional Variation." *Transition and Challenge: China's Population at the Beginning of the 21st Century*. Ed. William Lavely. N.p.: Oxford Scholarship Online, 2007. 1–20. Print.

Chan, Kam Wing. "Chinese Census 2000: New Opportunities and Challenges." *The China Review* 3.2 (2003): 1–12. Print.

Chan, Kam Wing. "China: Internal Migration." *The Encyclopedia of Global Human Migration*. N.p.: Blackwell, 2013. 1–3444. Print.

——. China. Department of Population and Employment Statistics. National Bureau of Statistics.*Tabulation on the 2010 Population Census of the People's Republic of China by County*. Comp. Population Census Office under the State Council. N.p.: China Statistics, 2010. Print.

——. China. Department of Population and Employment Statistics. National Bureau of Statistics.*Tabulation on the 2000 Population Census of the People's Republic of China by County*. Comp. Population Census Office under the State Council. N.p.: China Statistics, 2000. Print.

Coltrane, Scott. "Father-Child Relationships and the Status of Women: A Cross-Cultural Study." *American Journal of Sociology* 93.5 (1988): 1060–095. Print.

Croll, E. *Changing Identities of Chinese Women—Rhetoric, Experience and Self-perception in Twentieth-century China.* Hong Kong: Hong Kong University Press, 10995. Print.

Cui, Hongyan, Lan Xu, and Rui Li. "An Evaluation of Data Accuracy of the 2010 Population Census of China." *Population Research* 37.1 (2013): 10–21. Print.

den Boer, Andrea and Valerie Hudson. "Sex Ratios and National Security in China. "Beyond Geopolitics: Building a New Framework for Sino-American Relations," Tsinghua University. Beijing, China. 2 November 2013: 1-53. Presentation.

Ding, Qu Jian, and Therese Hesketh. "Family Size, Fertility Preferences, and Sex Ratio in China in the Era of the One Child Family Policy: Results from National Family Planning and Reproductive Health Survey." *BMJ Publishing Group* 333.7564 (2006): 371–73. Print.

Dyson, Tim. "Causes and Consequences of Skewed Sex Ratios." *Annual Review of Sociology* 38 (2012): 443–61. Print.

Ebenstein, Avraham. "Estimating a Dynamic Model of Sex Selection in China." *Demography* 48 (2011): 783–811. Print.

Ebenstein, Avraham. "The 'Missing Girls' of China and the Unintended Consequences of the One Child Policy." *The Journal of Human Resources* 45.1 (2011): 87–115. Print.

Edlund, Lena. "Son Preference, Sex Ratios, and Marriage Patterns." *Journal of Political Economy* 107.6 (1999): 1275–304. Print.

Edlund, Lena, Hongbin Li, Junjian Yi, and Junsen Zhang. "Sex Ratios and Crime: Evidence from China." *Review of Economics and Statistics* (2009): 1–56. Print.

Eklund, Lisa. "Modeling Prenatal Son Preference: Some New Perspectives from China." *Population Review* 50.2 (2011): 47-66. Print.

——. "Gender Gaps in China: Facts and Figures." Oct. 2006, 2–50. The World Bank. Web. 20 Oct. 2013. <http://siteresources.worldbank.org/INTEAPREGTOPGENDER/Resources/Gender-Gaps-Figures&Facts.pdf>.

Greenhalgh, Susan. "Missile Science, Population Science: The Origins of China's One-Child Policy." *The China Quarterly* 182 (2005): 253–76. Print.

Hartmann, Heidi. "Capitalism, Patriarchy, and Job Segregation by Sex." *Signs: Journal of Women in Culture and Society* 1.3 (1976): 137–69. Print.

Hesketh, Therese, Lu Li, and Wei Xing Zhu. "The Effect of China's One-Child Family Policy after 25 Years." *The New England Journal of Medicine* 353.11 (2005):

1171–176. Print.

Hesketh, Therese. "Selecting Sex: The Effect of Preferring Sons." *Early Human Development* 87 (2011): 759–61. Print.

Hudson, Valerie M., and Andrea Den Boer. "A Surplus of Men, A Deficit of Peace: Security and Sex Ratios in Asia's Largest States." *International Security* 26.4 (2002): 5–38. Print.

——. "How Should the United States Address Its Chinese Trade Imbalance?" *Council on Foreign Relations*. McKinsey Executive Roundtable Series in International Economics, 9 Mar. 2011. Web. 22 Oct. 2013. Web.

Jiang, Qunbao, Shuzhuo Li, and Marcus W. Feldman. "China's Missing Girls in the Three Decades from 1980 to 2010." *Asian Women* 28.3 (2012): 54–73. Print.

Jiang, Quanbao, Shuzhuo Li, and Marcus W. Feldman. "Son Preference and the Marriage Squeeze in China: An Integrated Analysis of First Marriage and the Remarriage Market." *Watering the Neighbour's Garden: The Growing Demographic Female Deficit in Asia*. Ed. Isabelle Attane. Paris: Committee for International Cooperation in National Research in Demography, 2007. 347–63. Print.

Jin, Xiaoyi, Shuzhuo Li, and Marcus W. Feldman. "Marriage Form and Son Preference in Rural China: An Investigation in Three Counties." *Rural Sociology* 72.4 (2007): 511–36. Print.

Lai, Dejian. "Sex Ratio at Birth and Infant Mortality Rate in China: An Empirical Study." *Social Indicators Research* 70.3 (2005): 313–26. Print.

Lavely, William, and Xinhua Ren. "Patrilocality and Early Marital Co-residence in Rural China, 1955–85." *The China Quarterly* 130 (1992): 378–91. Print.

Lei, Lei, and Heili Pals. "Son Preference in China: Why Is It Stronger in Rural Areas?"*Population Review* 50.2 (2011): 27–46. Print.

Li, Hongbin, Junjian Yi, and Junsen Zhang. "Estimating the Effect of the One-Child Policy on the Sex Ratio Imbalance in China: Identification Based on the Difference-in-Differences." *Demography* 48 (2011): 1535–57. Print.

Li, Shuzhuo. "Imbalanced Sex Ratio at Birth and Comprehensive Intervention in China." Proc. of 4th Asia Pacific Conference on Reproductive and Sexual Health and Rights, India, Hyperabad: United Nations Population Fund, 2007. 1–16. <http://www.unfpa.org/gender/docs/studies/china.pdf>

Li, Shuzhuo. "One Minute with Li Shuzhuo." Interview by Donna Hesterman. *New*

Scientist 2011: 27. Print.

Li, Shuzhuo, Marcus W. Feldman, and Xiaoyi Jin. "Marriage Form and Family Division in Three Villages in Rural China." *Population Studies* 57.1 (2003): 95–108. Print.

Li, Shuzhuo, Xiao-qia Jin, and Marcus Feldman. "Uxorilocal Marriage and Its Demographic and Social Consequences in Contemporary Rural China: Findings of Investigation in Three Counties." *Journal of Xi'an Jiaotong University* 26.79 (2006): 51–64. Print.

Li, Shuzhuo, Yan Wei, Quanbao Jiang, and Marcus Feldman. "Imbalanced Sex Ratio at Birth and Female Child Survival in China: Issues and Prospects." *Watering the Neighbour's Garden: The Growing Demographic Female Deficit in Asia*. Ed. Marcus W. Feldman. Paris: Committee for International Cooperation in National Research in Demography, 2007. 25–47. Print.

Li, Shuzhuo, Chuzhu Zhu and Marcus W. Feldman. "Gender Differences in Child Survival in Contemporary Rural China: A County Study." *Journal of Biosocial Science* 36.1 (2004): 83–109. Web. 31 Oct. 2013.

Liang, Hong. "The Desired Childbearing Gender Preference of Guangdong Population and Its Affecting Variables (Guang Dong Ren Kou Yi Yuan Sheng Yu Xing Bie Pian Hao De Ying Xiang Yin Su Fen Xi)." *South China Population* 01 (2008): 25–33. Print.

Lipatov, Mikhail, Shuzhuo Li, and Marcus W. Feldman. "Economics, Cultural Transmission, and the Dynamics of the Sex Ratio at Birth in China." *Proceedings of the National Academy of Sciences* 105.49 (2008): 19171–76. Print.

Mason, Karen O. "The Impact of Women's Social Position on Fertility in Developing Countries." *Sociological Forum* 2.4 (1987): 718–45. Print.

——. "Myanmar: Bride Trafficking to China Unveiled." *IRIN*. UN Office for the Coordination of Humanitarian Affairs, 2 June 2011. Web. 22 Oct. 2013.

Nie, Jing-Bao. "Non-medical Sex-selective Abortion in China: Ethical and Public Policy Issues in the Context of 40 Million Missing Females." *British Medical Bulletin* 98 (2011): 7-20. Print.

Qiao, Xiaochun. "Sex Preference, Sex Selection and Sex Ratio at Birth." *Chinese Journal of Population* 1.1 (2004): 14–22. Print.

——.*Report of the International Workshop on Skewed Sex Ratios at Birth: Addressing the Issue and the Way Forward*. Rep. Ha Noi, Viet Nam: UNFPA, 2011: 1–46. Web.

Tan, Liang Ying. "Changing Mindsets: How China's Abnormal Sex Ratio Is Turning Its Government into a Champion of Gender Equality." *Asian Journal of Comparative Law* 3.1 (2008): 1–31. Print.

Tang, De-Piao, Chih-Sung Teng, and Jeng-Yi Liou. "Regional Disparity of the Sex Ratio at Birth in China: A Spatial Analysis." *Modern China Studies* 18.1 (2011): 129–60. Print.

Tsuya, Noriko O., and Larry L. Bumpass. *Marriage, Work, and Family Life in Comparative Perspective: Japan, South Korea, and the United States*. Honolulu: University of Hawai'i, 2004. Print.

Van De Kaa, Dirk J. "The Idea of a Second Demographic Transition in Industrialized Countries." Proc. of Sixth Welfare Policy Seminar of the National Institute of Population and Social Security, Japan, Tokyo. N.p., 2002. Web. <http://websv.ipss.go.jp/webj-ad/WebJournal.files/population/2003_4/Kaa.pdf>.

Wang, Jinying, and Yanxia Ge. "Assessment of 2010 Census Data Quality and Past Population Changes." *Population Research* 37.1 (2013): 22–33. Print.

Wang, Shanshan. "30m Men Face Bleak Future as Singles." *China Daily*. China Daily Information Co, 12 Jan. 2007. Web. 22 Oct. 2013.

Wu, Haixia, Shuzhuo Li, Xusong Yang. "Rural-Urban Migration and the Sex Ratio at Birth of Urban Region in China: Analysis Based on the Fifth Population Census." *Population & Economics (renkou yu jingji)*. 25.6 (2005): 11–18. Print.

Wu, Haixia, Xiaoyi Jin, and Shuzhuo Li. "Social Networks and Son Preference among Rural-Urban Migrants in China: A Study in Shenzhen." *Watering the Neighbour's Garden: The Growing Demographic Female Deficit in Asia*. Ed. Marcus W. Feldman. Paris: Committee for International Cooperation in National Research in Demography, 2007. 229–45. Print.

Yasuda, Tokio, Noriko Iwai, Chin-chun Yi, and Guihua Xie. "Intergenerational Coresidence in China, Japan, South Korea and Taiwan: Comparative Analyses Based on the East Asian Social Survey 2006." *Journal of Comparative Family Studies* 42.5 (2011): 703-22. Print.

Zeng, Yi, Ping Tu, Baochang Gu, Yi Xu, Baohua Li, and Yongpiing Li. "Causes and Implications of the Recent Increase in the Reported Sex Ratio at Birth in China." *Population and Development Review* 19.2 (1993): 283–302. Print.

Zhang, Kun, Shawn William Laffan, and Songlin Zhang. "A Spatial Approach to Select Pilot Counties for Programs to Correct the Biased Sex Ratio at Birth in Shandong Province, China." *International Journal of Geographical Information*

Science 24.3 (2010): 403–16. Print.

Zhou, Xu Dong, Xiao Lei Wang, Lu Li, and Therese Hesketh. "The Very High Sex Ratio in Rural China: Impact on the Psychosocial Wellbeing of Unmarried Men." *Social Science & Medicine* 73.9 (2011): 1422–27. Print.

——. *2009 Human Rights Report: China (includes Tibet, Hong Kong, and Macau)*. Rep. U.S. State Department, 11 May 2010. Web. 22 Oct. 2013.

Chen, Sheng Li. 陈, 胜利, ed. "Nühai shenghuo huanjing yanjiu: guanai nühai xingdong ji xian diaochao yanjiu baogao" *女孩生活环境研究：关爱女孩行动基线调查研究报告 [Research on Girls Life Environment: Care for Girls Campaign Base Investigative Research Report]*. Beijing 北京: Zhongguo renkou chubanshe 中国人口出版社, 2006. Print.

——. China. Care for Girls National Family Planning Population Office 国家人口计生委关爱女孩行动领导小组办公室专家组. "Zhongguo de guanai nühai xingdong" 中国的关爱女孩行动 [China's Care for Girls Campaign]. Beijing 北京: Zhongguo renkou chubanshe 中国人口出版社, 2010. Print.

——. China. China Population and Family Planning Committee 中国人口和计划生育委员会. "Guanai nühai xingdong: zonghe zhili chusheng xingbie bi wenti 100 lie" 关爱女孩行动：综合治理出生性别比问题100列 [Care for Girls Campaign: Summary of 100 Cases of Governing the Sex Birth Ratio Problem]. Beijing 北京: Zhongguo renkou chubanshe 中国人口出版社, 2009. Print.